

CLMPTO  
04/06/2001  
Y.V.

Claims 1-18 cancelled

19. A method for indicating a ciphering mode of data communication between a mobile communication network and a mobile station in the mobile communication network, the mobile communication network and the mobile station being capable of data communication in at least one enciphered mode of communication and in at least one unciphered mode of communication, comprising the steps of:

- in a situation where an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, sending from the mobile communication network to the mobile station a cipher mode control signal to indicate that an enciphered mode of communication is to be used;
- monitoring at the mobile station signals sent from the mobile communication network to the mobile station; and

- if monitored signals comprise a cipher mode control signal, indicating that an enciphered mode of data communication is to be used in communication between the mobile communication network and the mobile station.

20. A method according to claim 19 further comprising the step of causing the mobile station to enter an enciphered mode of communication if said monitored signals comprise a cipher mode control signal.

21. A method according to claim 19, further comprising the step of indicating that an unciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station if said monitored signals do not comprise a cipher mode control signal.

22. A method according to claim 19, wherein a ciphering mode to be used in data communication between the mobile communication network and the mobile station is specified by an operator of the mobile communication network.

23. A method according to claim 19, wherein a ciphering mode to be used in data communication between the mobile communication network and the mobile station is determined during establishment of data communication between the mobile communication network and the mobile station.

24. A method according to claim 19, wherein a ciphering mode to be used in data communication between the mobile communication network and the mobile station is determined prior to establishment of data communication between the mobile communication network and the mobile station.
25. A method according to claim 24, wherein determination of the ciphering mode to be used in data communication prior to establishment of data communication between the mobile communication network and the mobile station is performed by means of a location update procedure.
26. A method according to claim 19, wherein a ciphering mode to be used in data communication between the mobile communication network and the mobile station is determined during a communication handover procedure that occurs when the mobile station moves between a first part of the mobile communication network and a second part of the mobile communication network.
27. A method according to claim 19, further comprising the steps of:
- maintaining a cipher mode indication data field in the mobile station;
  - initially setting said cipher mode indication data field into a first state indicative that an unciphered mode of communication is to be used in data communication between the communication network and the mobile station; and

11  
21

9

- in a situation in which said monitored signals comprise a cipher mode control signal, updating the state of the cipher mode indication data field into a second state indicative that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station.
28. A method according to claim 19, wherein in addition to indicating a ciphering mode, a change in ciphering mode is indicated.
29. A method according to claim 19, wherein data communication between the mobile communication network and the mobile station takes place at least in part over a radio link.
30. A method according to claim 19, wherein the mobile communication network is a GSM network.
31. A method according to claim 19, wherein the mobile station comprises a display unit and the ciphering mode used in data communication between the mobile communication network and the mobile station is indicated by the display unit.
32. A method according to claim 19, wherein the mobile station comprises a light source and the ciphering mode used in data communication between the mobile communication network and the mobile station is indicated with the light source.

33. A method according to claim 28, wherein the mobile station comprises a display unit and an acoustic signal forming element, the ciphering mode used in data communication between the mobile communication network and the mobile station is indicated with the display unit, and a change in ciphering mode is indicated with the acoustic signal forming element.
34. A method according to claim 32, wherein a change in ciphering mode is indicated with a flashing light.
35. A method according to claim 19, wherein a change in ciphering mode is indicated by vibration.
36. A method according to claim 19, wherein the mobile station comprises a radio resource management block, a cipher indication memory block, and a user interface block, the step of monitoring signals sent from the mobile communication network to the mobile station is performed by the radio resource management block and a cipher mode indication data field is maintained in the cipher indication memory block, wherein upon determining that said monitored signals comprise a cipher mode control signal, said radio resource management block sets the cipher mode indication data field in said cipher indication memory block to correspond with cipher indication data in said cipher mode control signal.
37. A method according to claim 36, wherein said cipher indication memory block makes an interrupt request in response to a change in the cipher mode indication data field.

38. A method according to claim 37, wherein the user interface block detects said interrupt request and sends an inquiry to the cipher indication memory block to inquire about the state of the cipher mode indication data field, and the cipher indication memory block returns an indication of the state of said cipher mode indication data field in response to said inquiry.
39. A method according to claim 38, wherein the mobile station comprises a cipher mode indicator and the user interface block controls the cipher mode indicator according to said indication.
40. A method according to claim 36, wherein the cipher indication memory block provides an indication of the state of said cipher mode indication data field to the user interface block when the state of said cipher mode indication data field is changed.
41. A method according to claim 40, wherein the mobile station comprises a cipher mode indicator, and the user interface block controls the cipher mode indicator according to said indication.
42. A method according to claim 36, wherein the user interface block sends repeated inquiries to the cipher indication memory block about the state of the cipher mode indication data field, each inquiry being separated in time from the next by a predetermined interval, and the cipher indication memory block returns an indication

of the state of the cipher mode indication data field in response to each inquiry.

43. A method according to claim 42, wherein the mobile station comprises a cipher mode indicator and the user interface block controls the cipher mode indicator according to said indication.
44. A method according to claim 19, wherein the mobile communication network and the mobile station are capable of a first and a second type of data communication, each of said first and said second types of data communication having an enciphered mode and an unciphered mode, wherein a ciphering mode of each of said first and second types of data communication is indicated.
45. A method according to claim 44, wherein the first type of data communication is a telephone call and said second type of data communication is a short message (SMS).
46. A method according to claim 44, wherein the ciphering mode of the first type of data communication is indicated in a manner distinguishable from that used to indicate the ciphering mode of the second type of data communication.
47. A method according to claim 44, wherein a change in ciphering mode of the first type of data communication is indicated, and a change in ciphering mode of the second type of data communication is indicated.

48. A method according to claim 19, wherein a first mobile station and a second mobile station are in data communication with each other through at least one mobile communication network and the ciphering mode between the mobile communication network and the first mobile station is indicated to a user of the second mobile station.
49. A method according to claim 19, wherein the mobile station is used in connection with a data processor external to the mobile station for data communication between the mobile communication network and the external data processor, the external data processor comprising a display unit, wherein a ciphering mode used in data communication between the mobile station and the mobile communication network is indicated on the display unit of the external data processor.
50. A method according to claim 49, wherein the external data processor further comprises an acoustic signal forming element and a change in ciphering mode used in data communication between the mobile station and the mobile communication network is indicated with the acoustic signal forming element of the external data processor.
51. A method according to claim 49, wherein an indication of the state of the cipher mode indication data field is provided from the mobile station to the external data processor.



52. A method according to claim 49, wherein the mobile station and the external data processor are connected by means of a connection bus.
53. A method according to claim 49, wherein the mobile station comprises a cipher indication memory block which maintains a cipher mode indication data field indicative of a ciphering mode used in data communication between the mobile communication network and the mobile station, and the external data processor is provided with application software for monitoring the ciphering mode used in data communication between the mobile station and the mobile communication network, wherein the application software in said external data processor sends a cipher mode inquiry message to the mobile station to determine the state of the cipher mode indication data field maintained in said cipher indication memory block of the mobile station.
54. A method according to claim 53, wherein the mobile station returns an indication of the state of said cipher mode indication data field in response to said inquiry.
55. A method according to claim 19, wherein a mobile station is in data communication with a terminal in a fixed line communication network, and a ciphering mode between the fixed line communication network and the terminal in the fixed line communication network is indicated to a user of the mobile station.

56. A method according to claim 55, wherein the mobile station sends an inquiry message to the terminal in the fixed line communication network to determine the ciphering mode used in communication between the fixed line communication network and said terminal.

57. A method according to claim 56, wherein if the mobile station does not receive a response to said inquiry message, the mobile station indicates that the ciphering mode used in data communication is unknown.

58. A method according to claim 55, wherein if the mobile station receives a response to said inquiry message, but cannot interpret said response the mobile station indicates that the ciphering mode used in data communication is unknown.

59. An apparatus for indicating a ciphering mode of data communication between a mobile communication network and a mobile station in the mobile communication network, the mobile communication network and mobile station being capable of data communication in at least one enciphered mode of communication and at in least one unciphered mode of communication, the apparatus comprising:

- means for monitoring signals sent from the mobile communication network to the mobile station;
- means for determining if monitored signals comprise a cipher mode control signal; and

- means responsive to said determining means for indicating that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals comprise a cipher mode control signal.
60. An apparatus according to claim 59, further comprising means for causing the mobile station to enter an enciphered mode of communication if said monitored signals comprise a cipher mode control signal.
61. An apparatus according to claim 59, further comprising means responsive to said determining means for indicating that an unciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals do not comprise a cipher mode control signal.
62. An apparatus according to claim 59, arranged to determine the ciphering mode to be used in data communication between the mobile communication network and the mobile station during establishment of data communication between the mobile communication network and the mobile station.
63. An apparatus according to claim 59, arranged to determine the ciphering mode to be used in data communication between the mobile communication network and the mobile station prior to establishment of data communication between the mobile communication network and the mobile station.

64. An apparatus according to claim 63, arranged to determine the ciphering mode to be used in data communication prior to establishment of data communication between the mobile communication network and the mobile station by performing a location update procedure.

65. An apparatus according to claim 59, further comprising:

- means for maintaining a cipher mode indication data field;
- means for setting said cipher mode indication data field initially into a first state indicative that an unciphered mode of communication is to be used in data communication between the communication network and the mobile station; and
- means responsive to said determining means for changing the state of the cipher mode indication data field into a second state indicative that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals comprise a cipher mode control signal.

66. An apparatus according to claim 59, wherein said means for indicating a ciphering mode comprise a display unit.

67. An apparatus according to claim 59, wherein said means for indicating a ciphering mode comprise a light source.

68. An apparatus according to claim 59, wherein the apparatus further comprises means for indicating a change in ciphering mode.
69. An apparatus according to claim 68, wherein said means for indicating a change in ciphering mode comprise an acoustic signal forming element.
70. An apparatus according to claim 68, wherein said means for indicating a change in ciphering mode comprise means for generating vibration.
71. An apparatus according to claim 59 provided in a mobile station.
72. An apparatus according to claim 59, wherein said means for indicating a ciphering mode are provided in a data processor external to the mobile station and communicating with the mobile station.
73. An apparatus according to claim 68, wherein said means for indicating a change in ciphering mode are provided in a data processor external to the mobile station and communicating with the mobile station.
74. An apparatus according to claim 59, comprising a radio resource management block and a cipher indication memory block, wherein said means for monitoring signals sent from the mobile communication network to the mobile station and said means for determining if said monitored signals comprise a cipher mode control signal are

arranged in the radio resource management block and a cipher mode indication data field is maintained in the cipher indication memory block, the radio resource management block being further arranged to set the cipher mode indication data field in said cipher indication memory block to correspond with cipher indication data in a cipher mode control signal received from the mobile communication network.

75. An apparatus according to claim 74, wherein said cipher indication memory block is arranged to issue an interrupt request in response to a change in the cipher mode indication data field.
76. An apparatus according to claim 75, further comprising a user interface block, wherein the user interface block is arranged to detect said interrupt request and to send an inquiry to the cipher indication memory block to inquire about the state of the cipher mode indication data field and the cipher indication memory block is arranged to return an indication of the state of said cipher mode indication data field in response to said inquiry.
77. An apparatus according to claim 76, further comprising a cipher mode indicator, the user interface block being arranged to control the cipher mode indicator according to said indication.
78. An apparatus according to claim 74, further comprising a user interface block, wherein the cipher indication memory block provides an indication of the state of said

cipher mode indication data field to the user interface block when the state of said cipher mode indication data field is changed.

79. An apparatus according to claim 78, further comprising a cipher mode indicator, the user interface block being arranged to control the cipher mode indicator according to said indication.
80. An apparatus according to claim 74, further comprising a user interface block, wherein the user interface block sends repeated inquiries to the cipher indication memory block about the state of the cipher mode indication data field, each inquiry being separated in time from the next by a predetermined interval and the cipher indication memory block returns an indication of the state of the cipher mode indication data field in response to each inquiry.
81. An apparatus according to claim 80, wherein the mobile station comprises a cipher mode indicator and the user interface block controls the cipher mode indicator according to said indication.
82. A mobile station comprising apparatus for indicating a ciphering mode of data communication between a mobile communication network and the mobile station, the mobile communication network and mobile station being capable of data communication in at least one enciphered mode of communication and at least one unciphered mode of communication. the apparatus comprising.

- means for monitoring signals sent from the mobile communication network to the mobile station;
- means for determining if monitored signals comprise a cipher mode control signal; and
- means responsive to said determining means for indicating that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals comprise a cipher mode control signal.

83. A mobile station according to claim 82 further comprising means for causing the mobile station to enter an enciphered mode of communication if said monitored signals comprise a cipher mode control signal.

84. A mobile station according to claim 82, further comprising means responsive to said determining means for indicating that an unciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals do not comprise a cipher mode control signal.

85. A mobile station comprising apparatus for indicating a ciphering mode of data communication between a mobile communication network and the mobile station, the mobile communication network and mobile station being capable of data communication in at least one enciphered mode of communication and in at least one unciphered mode of communication, the mobile station comprising:



- means for monitoring signals sent from the mobile communication network to the mobile station;
- means for monitoring if monitored signals comprise a cipher mode control signal;
- means for causing the mobile station to enter an enciphered mode of communication if said monitored signals comprise a cipher mode control signal; and
- means responsive to said determining means for indicating a ciphering mode, comprising means for indicating that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals comprise a cipher mode control signal, and means for indicating that an unciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals do not comprise a cipher mode control signal.

86. A mobile station according to claim 85, comprising a radio resource management block and a cipher indication memory block, wherein said means for monitoring signals sent from the mobile communication network to the mobile station and said means for determining if said monitored signals comprise a cipher mode control signal are arranged in the radio resource management block and a cipher mode indication data field is maintained in the cipher indication memory block, the radio resource

management block being further arranged to set the cipher mode indication data field in said cipher indication memory block into one of a first state and a second state, said first state being indicative of an unciphered mode of communication to be used in data communication between the communication network and the mobile station and said second state being indicative of an enciphered mode of communication to be used in data communication between the mobile communication network and the mobile station.

87. A mobile station according to claim 86, wherein said cipher indication memory block is arranged to issue an interrupt request in response to a change in the cipher mode indication data field.
88. A mobile station according to claim 87, further comprising a user interface block, wherein the user interface block is arranged to detect said interrupt request and to send an inquiry to the cipher indication memory block to inquire about the state of the cipher mode indication data field and the cipher indication memory block is arranged to return an indication of the state of said cipher mode indication data field in response to said inquiry.
89. A mobile station according to claim 88, wherein said user interface block controls said means for indicating a ciphering mode in response to said indication of the state of the cipher mode indication data field.

90. A mobile station according to claim 86, further comprising a user interface block, wherein the cipher indication memory block provides an indication of the state of said cipher mode indication data field to the user interface block when the state of said cipher mode indication data field is changed.
91. A mobile station according to claim 90, wherein said user interface block controls said means for indicating a ciphering mode in response to said indication of the state of the cipher mode indication data field.
92. A mobile station according to claim 86, further comprising a user interface block, wherein the user interface block sends repeated inquiries to the cipher indication memory block about the state of the cipher mode indication data field and the cipher indication memory block returns an indication of the state of the cipher mode indication data field in response to each inquiry.
93. A mobile station according to claim 92, wherein said user interface block controls said means for indicating a ciphering mode in response to said indication of the state of the cipher mode indication data field.
94. A system for indicating a ciphering mode of data communication between a mobile communication network and a mobile station in the mobile communication network, the mobile communication network and the mobile station being capable of data communication in at least one

enciphered mode of communication and at least one unciphered mode of communication, the system comprising:

- means in the mobile communication network for determining whether an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station according to a setting of the mobile communication network;
- means in the mobile communication network for sending a cipher mode control signal from the mobile communication network to the mobile station in a situation where an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station;
- means in the mobile station for monitoring signals sent from the mobile communication network to the mobile station;
- means in the mobile station for determining if monitored signals comprise a cipher mode control signal; and
- means responsive to said determining means for indicating that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals comprise a cipher mode control signal.

95. A system according to claim 94, further comprising means in the mobile station for causing the mobile station to

enter an enciphered mode of communication if said monitored signals comprise a cipher mode control signal.

96. A system according to claim 94, further comprising means responsive to said determining means for indicating that an unciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, if said monitored signals do not comprise a cipher mode control signal.

97. A data processor external to a mobile station and capable of use with the mobile station for data communication between the external data processor and a mobile communication network via the mobile station, the mobile communication network and the mobile station being capable of data communication in at least one enciphered mode of communication and in at least one unciphered mode of communication, the external data processor comprising apparatus for receiving from the mobile station, information concerning a ciphering mode used in communication between the mobile station and the mobile communication network, and means responsive to information received from the mobile station for indicating a ciphering mode used in communication between the mobile station and the mobile communication network.

98. A method for indicating a ciphering mode of data communication between a mobile communication network and a mobile station in the mobile communication network, the mobile communication network and the mobile station being capable of data communication in at least one

enciphered mode of communication and in at least one unciphered mode of communication, and in a situation where an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station, sending from the mobile communication network to the mobile station a cipher mode control signal to indicate that an enciphered mode of communication is to be used; the method comprising the steps of:

- monitoring at the mobile station signals sent from the mobile communication network to the mobile station; and
- if monitored signals comprise a cipher mode control signal, indicating that an enciphered mode of communication is to be used in data communication between the mobile communication network and the mobile station.